

LOW WORK FUNCTION MATERIAL

CROSS-REFERENCE TO RELATED APPLICATIONS

5 The present application is a continuation-in-part of United States Patent Application Serial No. 10/005,989 filed December 5, 2001, which claims priority to United States Provisional Patent Application Serial No. 60/254,374 filed December 8, 2000.

TECHNICAL FIELD

10 The present invention relates in general to field emission devices, and in particular to field emission devices comprising carbon nanotubes.

BACKGROUND INFORMATION

15 Carbon films, including carbon nanotube (CNT) materials, are being developed for cold cathode applications. These applications include field emission displays, x-ray tubes, microwave devices, CRTs, satellite thrusters, or any applications requiring a source of electrons. There are many types of carbon films that are being considered. The emission mechanism believed to be responsible for the emission of electrons from these carbon films is the Fowler-Nordheim theory; this is especially true for the carbon films that are conducting. Included in this emission mechanism is an electrical barrier at the surface of the conductor that prevents electrons from exiting the metal. However, if a strong field is applied, this barrier is lowered or made thin such that electrons can now "tunnel" through the barrier to create a finite emission current. The height of this barrier is partially determined by